

# Pain Management

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Physical Medicine & Rehabilitation

SPECIAL  
REPORT

HEALTH & TECHNOLOGY: WHAT THE FUTURE MEANS FOR YOU  
**The Next Frontiers**

# Newsweek

May 19, 2003

newsweek.msnbc.com

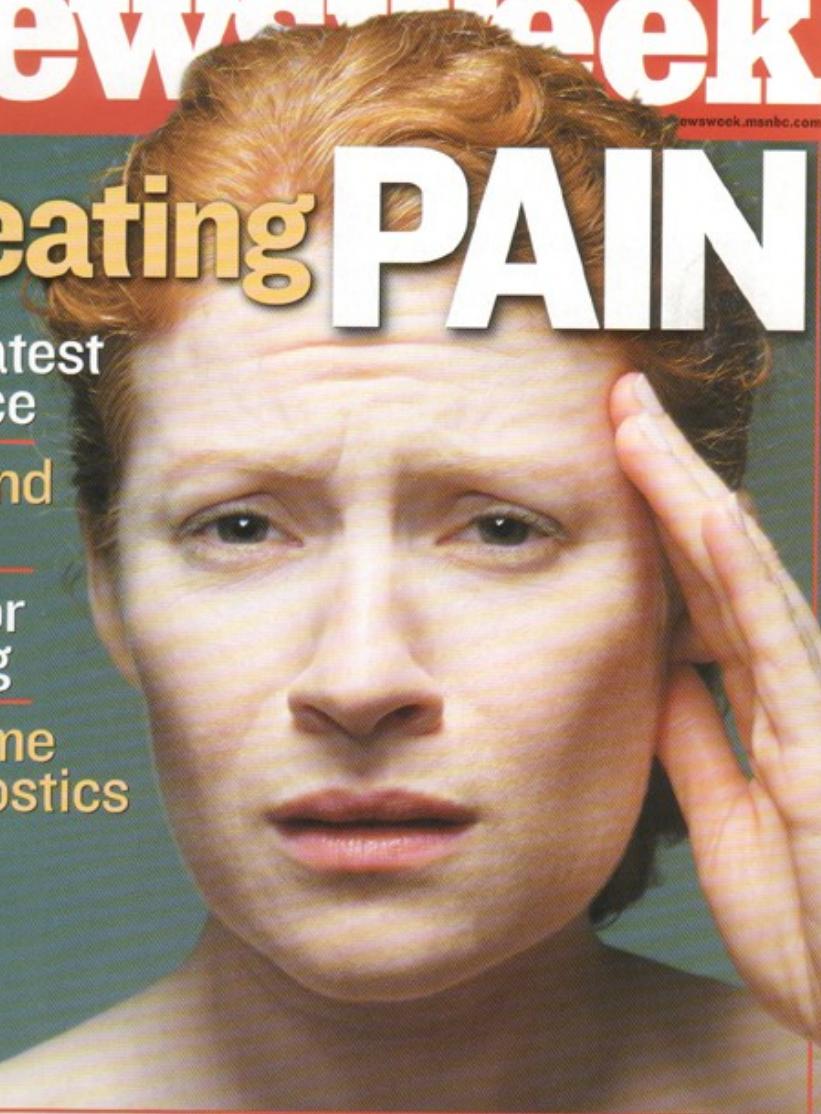
## Treating PAIN

The Latest  
Science

Kids and  
Pain

Tips for  
Coping

At-Home  
Diagnostics



- In the United States, 15% to 20% of the population have acute pain, and between 25% and 30% have chronic pain...
- Causes more disability than cancer and heart disease combined.
- Annual cost, including treatment and lost work days, estimated to be \$100 billion

# New JCAHO Pain Standards

- Patients have a right to pain management.
- All patients are assessed for pain.
- Policies and procedures exist for pain interventions.
- Pain should be controlled as not to interfere with rehabilitation.
- Patients and providers should be educated in pain management.
- Patients discharged from hospital must have their pain needs addressed.
- PI should exist for the organizations pain management.

# **Introduction**

- Common Definitions
- Historical Perspective
- Physiology
- Patient Evaluation
- Common Pain Conditions
- Treatment Options

# Definitions

## Acute Pain

- Rapid onset
- Short to moderate duration
- Symptom of some other disease process
- Signal to avoid or modify activity
- Correlates well with degree of tissue injury
- Dissipates with healing

## Chronic Pain

- Pain > 3-6 months duration.
- Malignant
- Nonmalignant

*“Whereas in acute pain  
the pain is a symptom of  
disease or injury, in  
chronic pain the pain  
itself is the disease.”*

**Bonica, John J.**

*“Chronic pain is  
defined as any consult  
which is preceded by  
an apology.”*

# Definitions

- **Allodynia** - pain arising from a stimulus that does not normally provoke pain
- **Dysesthesia** - an unpleasant abnormal sensation, whether spontaneous or evoked
- **Hyperalgesia** - an increased response to a stimulus that is normally painful
- **Hypoesthesia** - decreased sensitivity to stimulation
- **Analgesia** - absence of pain in response to stimulation that would normally be painful

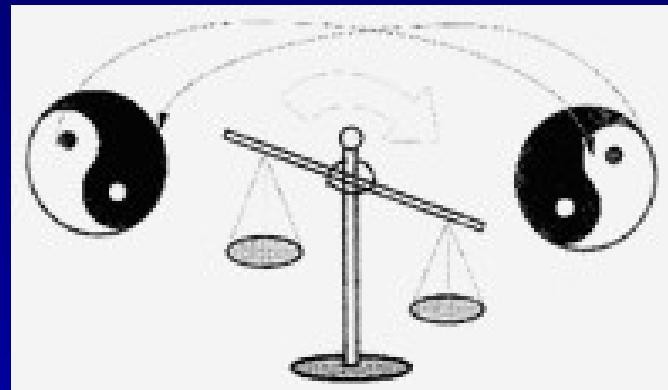
# Definitions

- **Hypoalgesia** - diminished pain in response to a normally painful stimulus
- **Hyperpathia** - a painful syndrome characterized by increased reaction to a stimulus, especially a repetitive stimulus, as well as an increased threshold
- **Neuralgia** - pain in the distribution of a nerve or nerves
- **Neuropathy** - a disturbance of function or pathological change in a nerve (mononeuropathy, radiculopathy, plexopathy, polyneuropathy)
- **Deafferentation Pain** - pain resultant from denervation (injury or disease process)

# **Definitions**

- Tolerance
- Dependence
- Addiction
- Pseudo-Addiction
- Diversion
- Malignant vs. Nonmalignant Pain

# Historical Perspectives

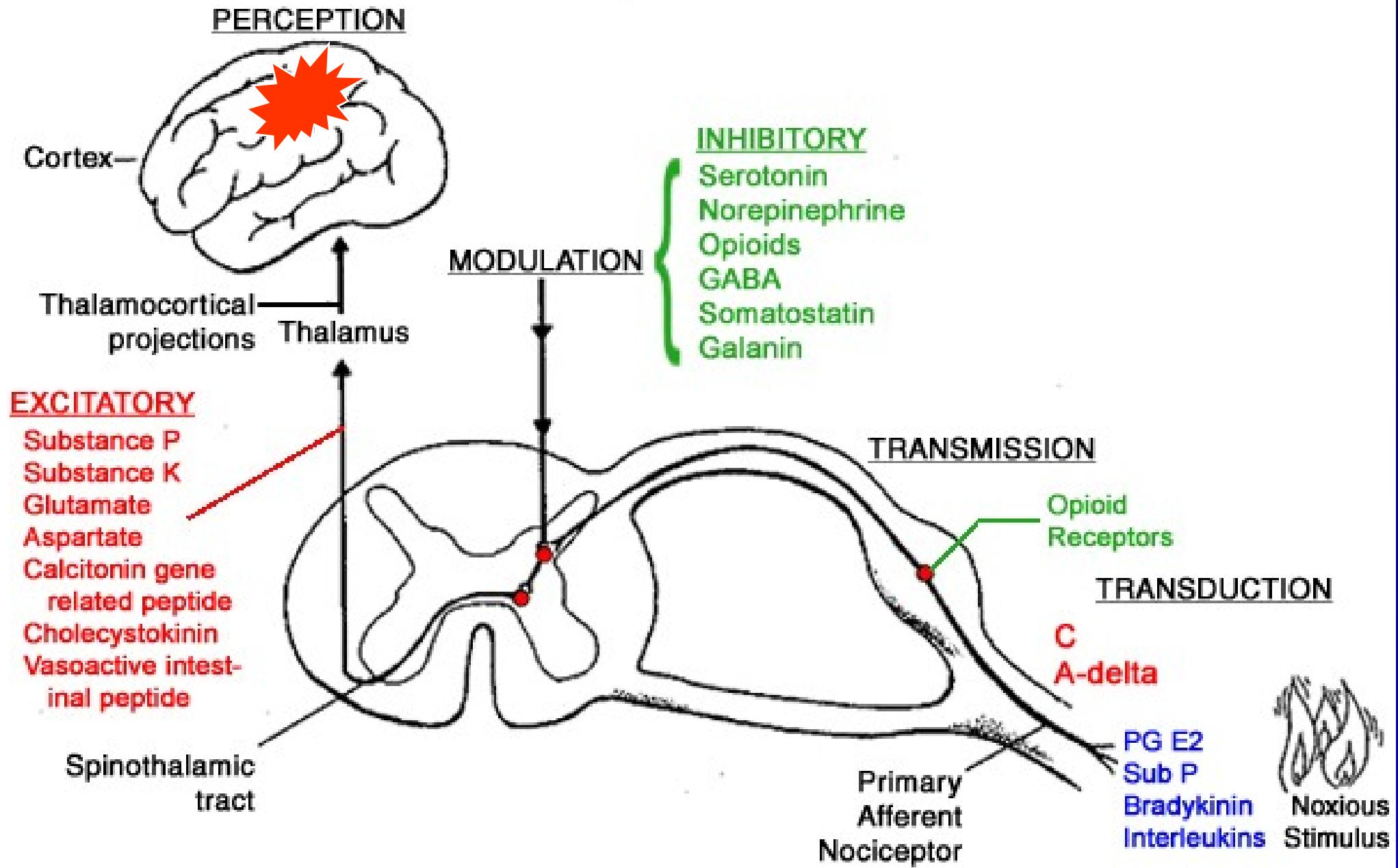


- **Hippocrates:** Balance between four humors (blood, phlegm, yellow bile, and black bile)
- **Plato:** Pain and pleasure are linked together

*Pain was not just from peripheral stimulation  
but an emotional experience*

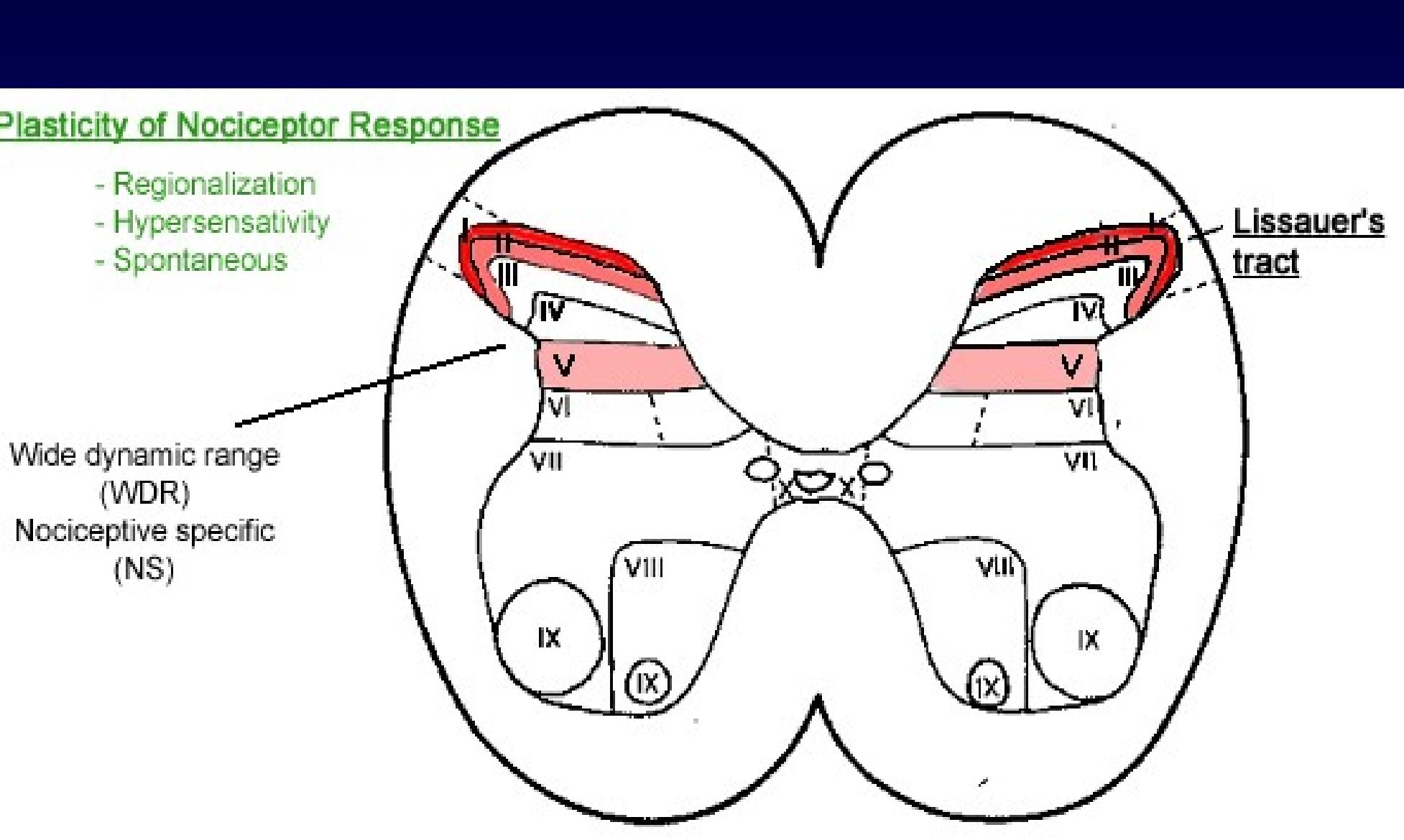
- **Aristotle:** *Sensorium commune - Heart*
- **Leonardo da Vinci:** *Sensorium commune - third ventricle of the brain and the spinal cord is a conductor, transmitting sensations to the brain.*





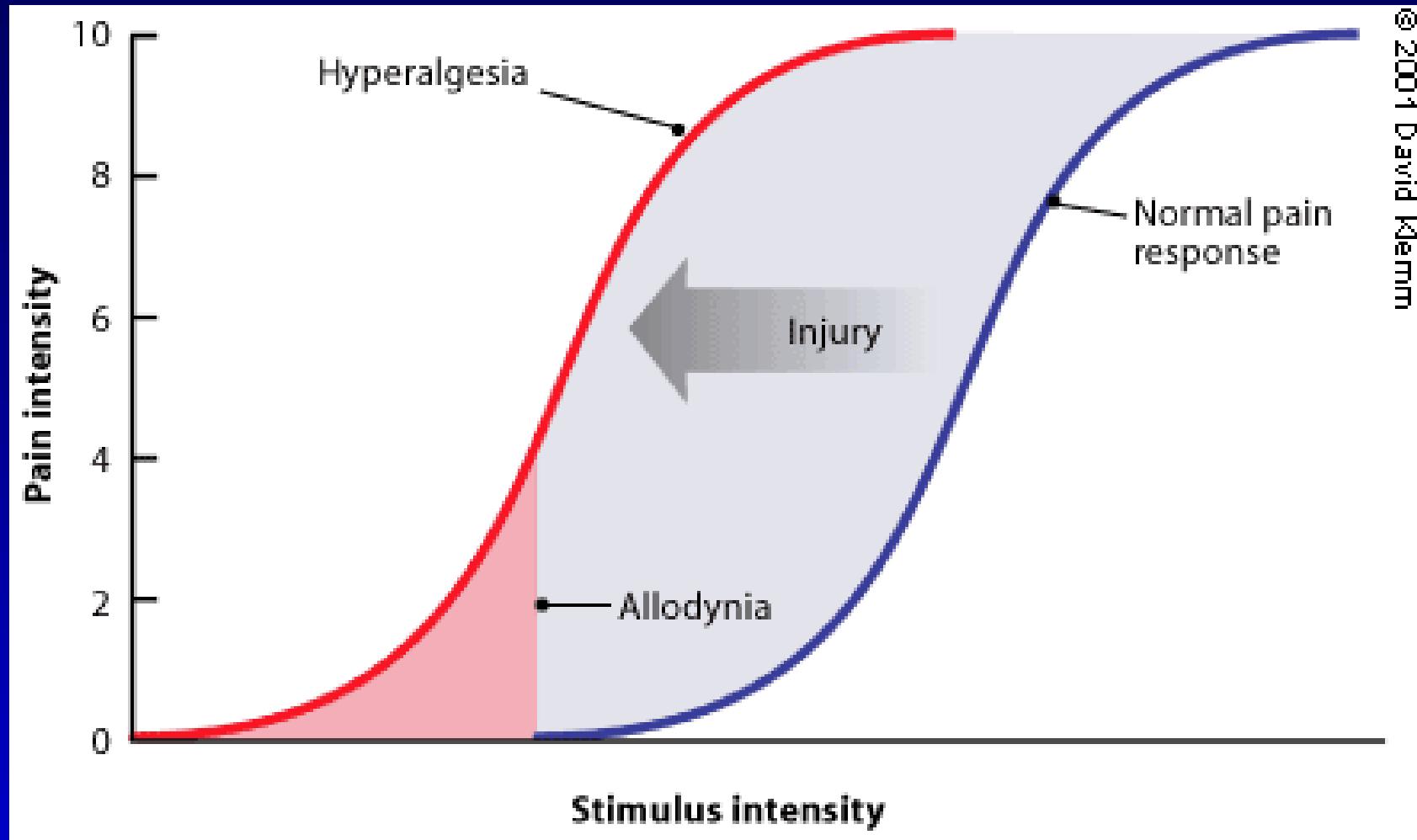
## Plasticity of Nociceptor Response

- Regionalization
- Hypersensitivity
- Spontaneous



# Pain Sensitization

## from noxious stimuli



JUNE 2, 2003

www.time.com AOL Keyword: TIME

SADDAM'S SONS: EVEN BADDER THAN YOU THOUGHT

# TIME

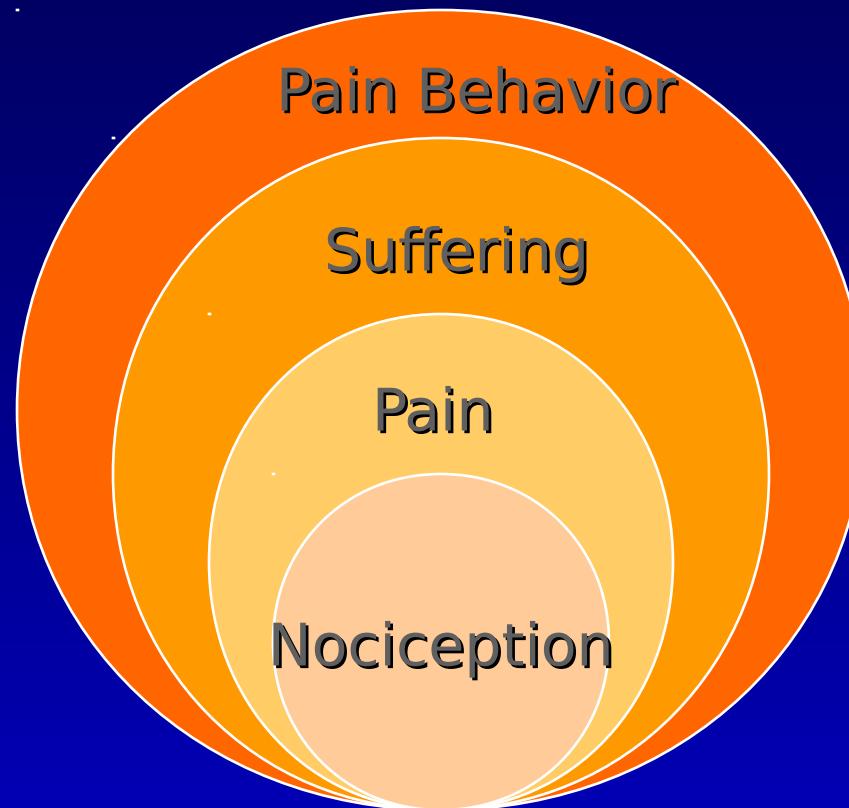
Are you  
programmed  
from birth, or  
does life change  
the program?  
A radical new  
look at ...

WHAT  
MAKES YOU  
**SPECIAL**

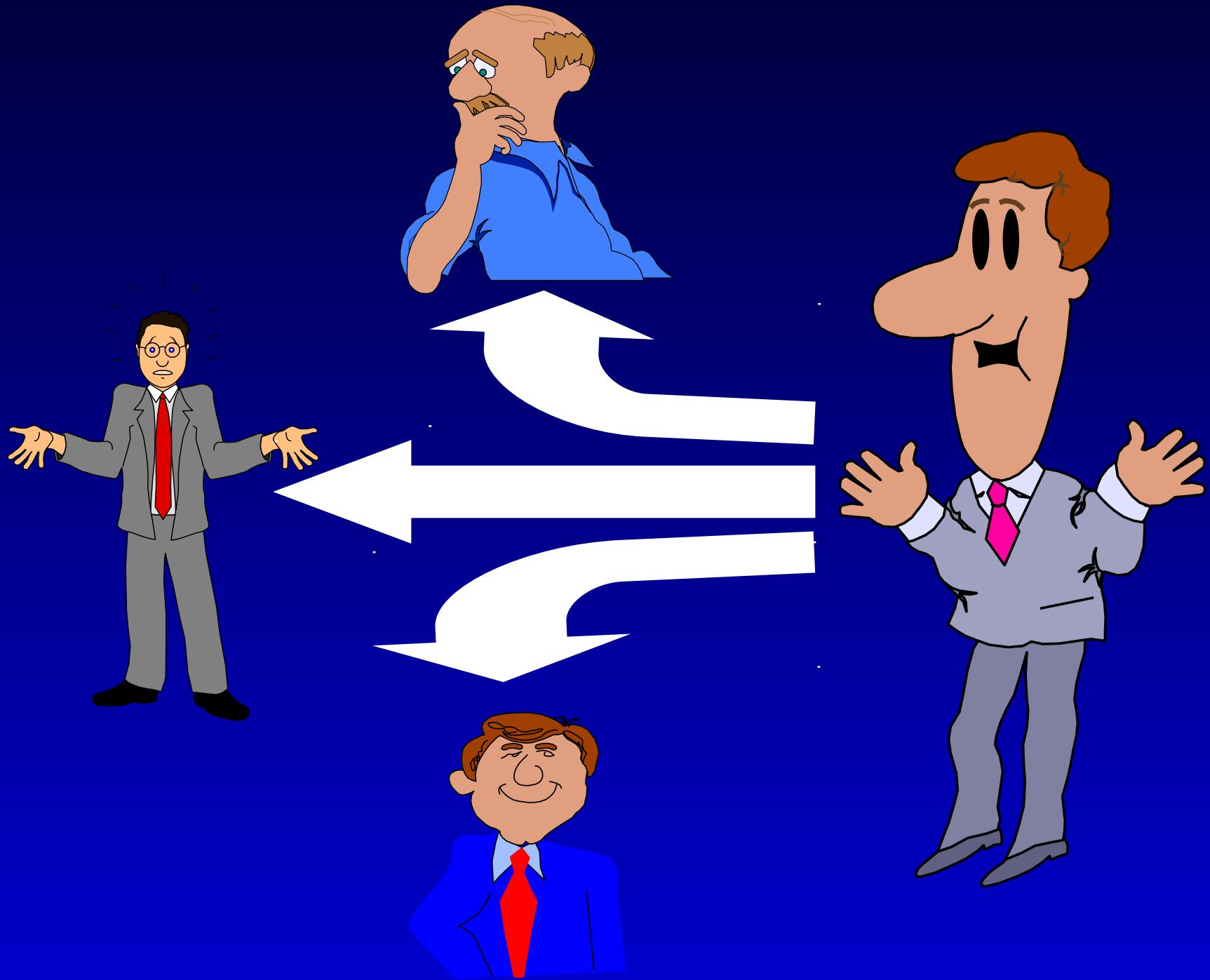
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4325 ROSEDALE AVE  
BETHESDA MD 20814-4750

# Nature Vs. Nurture

# Behavioral Pain Syndrome Model



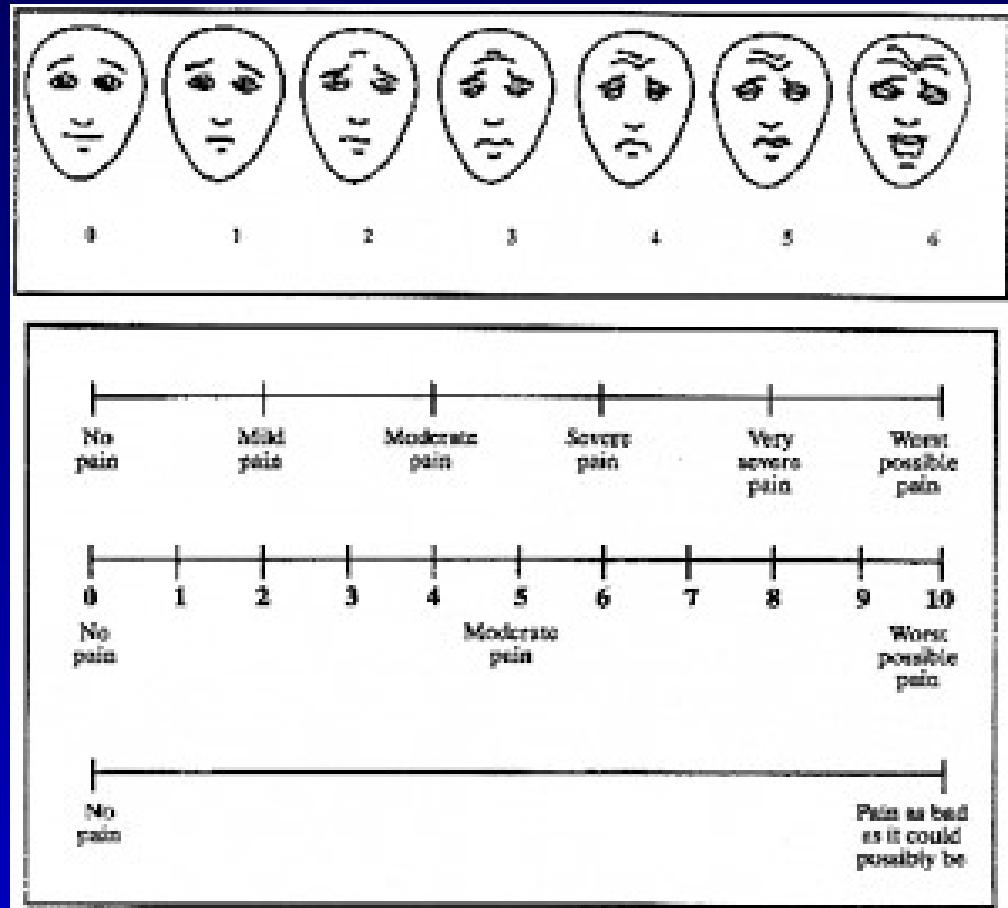
Loeser's Concept of Pain



# Patient Evaluation

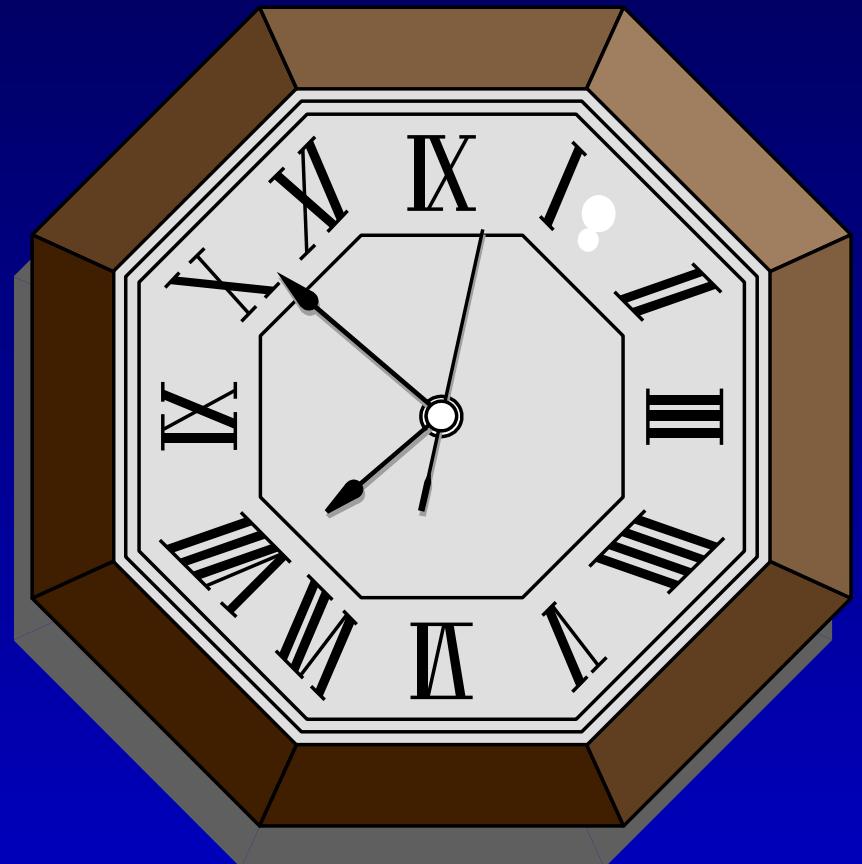
# History

- No biological markers
  - rely on patient's report
- Comprehensive
  - questionnaire
- Intensity/ Quality
  - pain scale
- Modifiers
- PMHx / PSHx



# **History - Key Points**

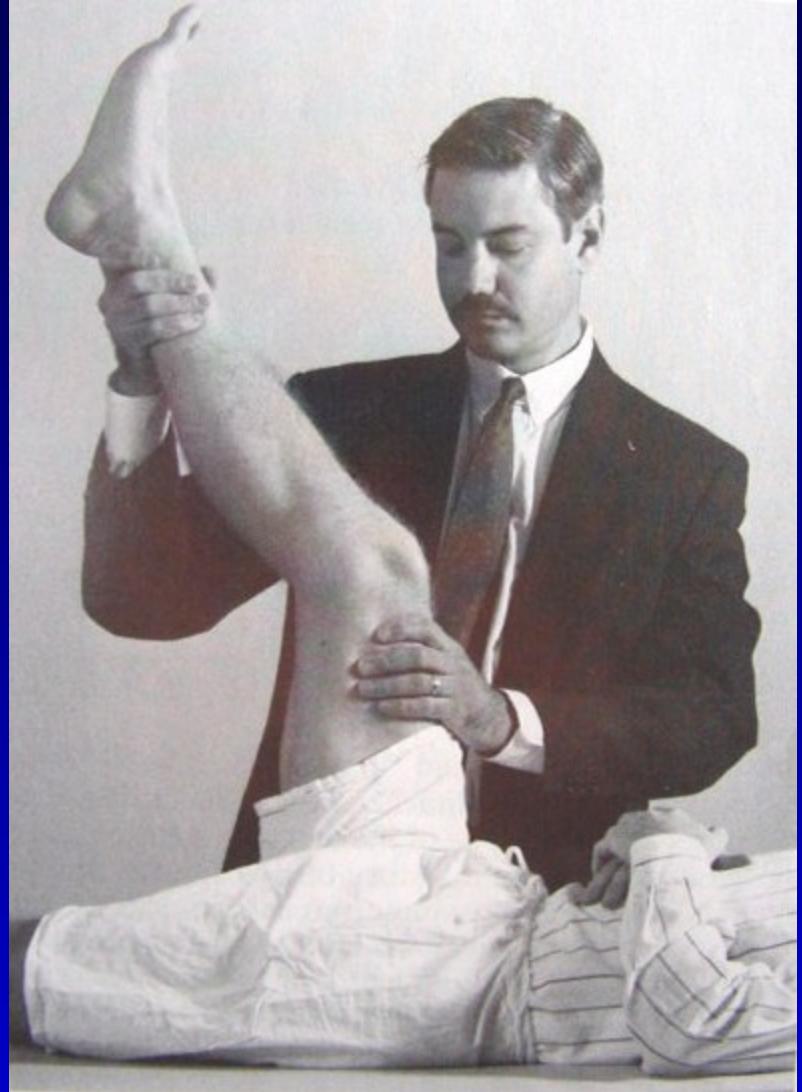
- **Treatments tried**
  - therapy
  - modalities
  - medications
  - alternative
- **Sleep disturbance**
- **Functional disturbance**
  - ADL's, work, recreation
- **Psycho-Social stressors**
  - active listening





# Physical Exam

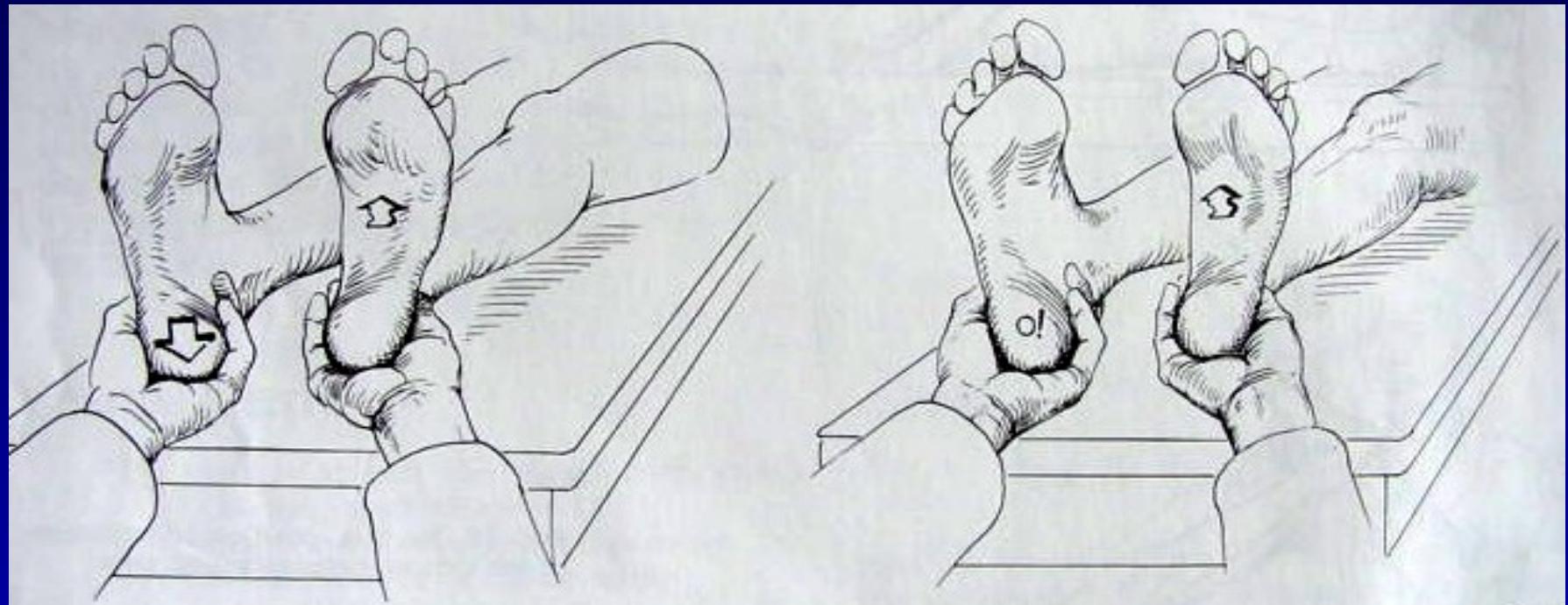
- Neurologic
  - mental status/affect
  - numbness/weakness
  - hyperpathia, allodynia
- Musculoskeletal
  - Deformities / atrophy
  - Inflammation
  - Tender / trigger points
  - Imbalances
- Gait & Function



# Waddell's Signs

R  
O  
S  
T  
D

- Regionalization
- Overreaction
- Simulation
- Tenderness
- Distraction



# Hoover's Test

# X-rays & Labs

- Try to find underlying cause
- Keep a broad differential dx
  - cancer (mets or visceral)  
(bone scan, MRI, CT)
  - infection / inflammation  
(ESR, ANA, RF, HLA-B27, HIV)
  - endocrine
- Meet patient's expectations
- Alleviate patient's fears

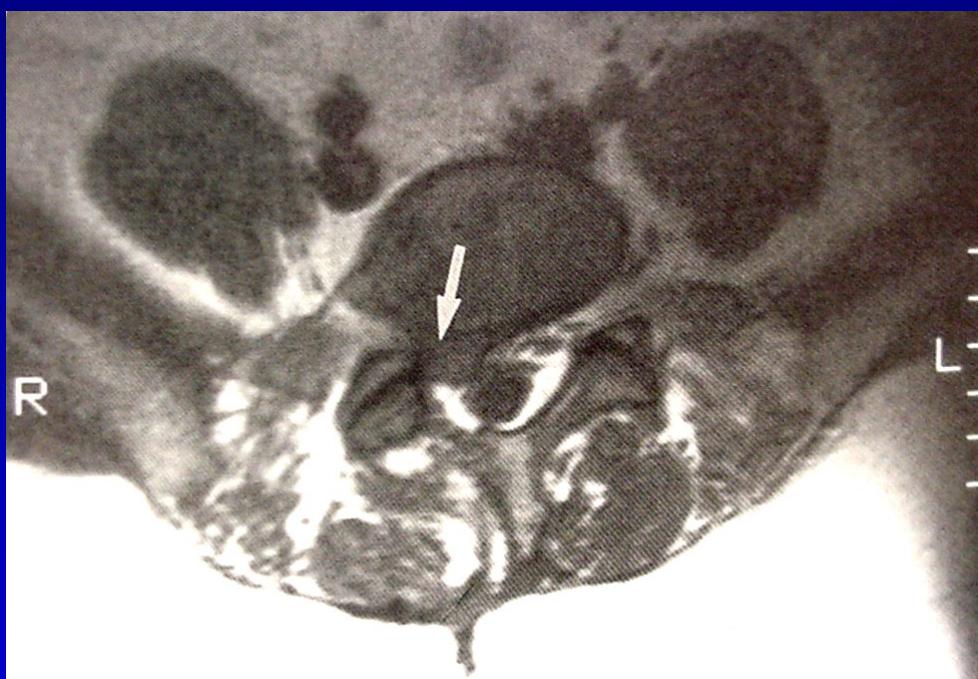
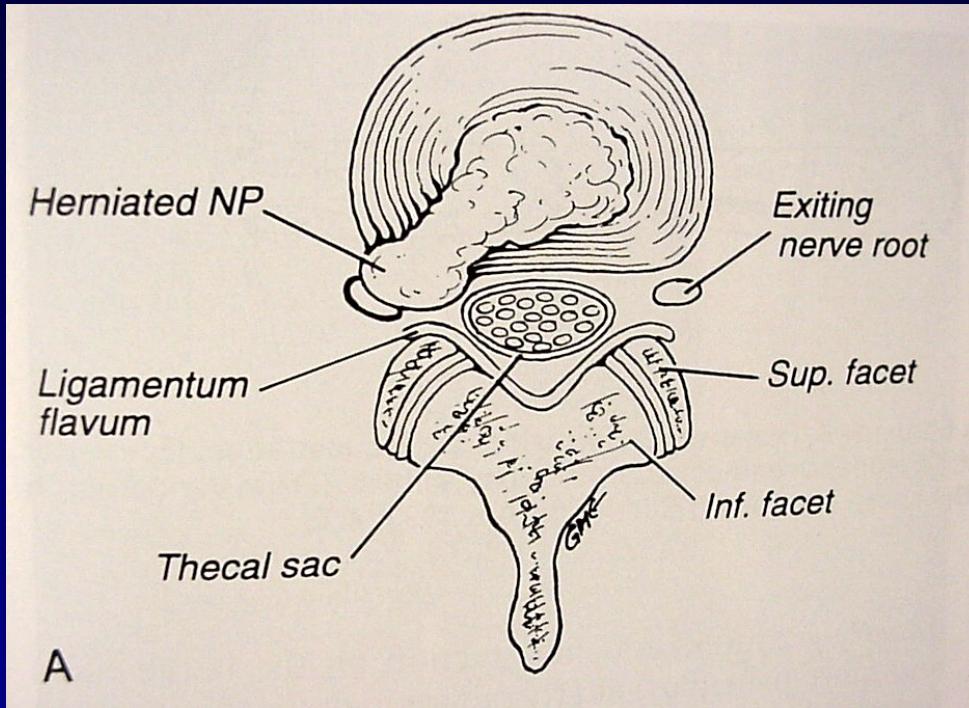


# Common Pain Conditions

- Cancer
- Arthritis
- Headaches
- Back & Neck
- Shoulder & Knee
- Neuropathies
  - focal & polyneuropathy
- Factitious
  - secondary gain
- Polymyalgia Rheumatica
- Fibromyalgia
- Myofascial Pain Syndrome
- Complex Regional Pain (RSD)
- Post-Herpetic Neuralgia
- Phantom Limb Pain
- Pelvic Pain
- Psychogenic
  - somatization, hysterical, conversion

# Back Pain

- Acute vs. Chronic
- Identify pain generators
  - mets, facet, disk, nerve
  - soft tissue (trigger points)
- Identify objective measures
  - deconditioning, inflexibility
  - weakness (neuropathic / disuse)
- Pain behavior
- Altered pain perception



# Fibromyalgia

vs.

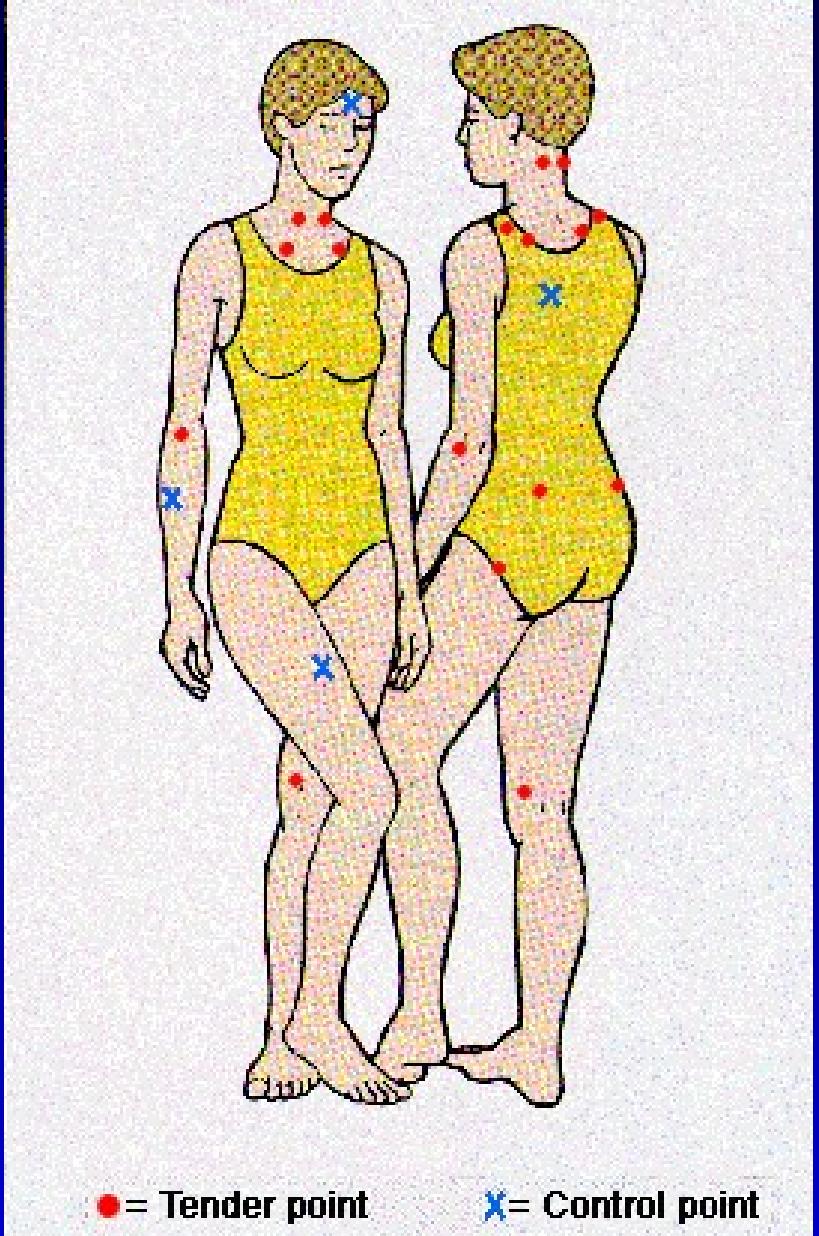
## Myofascial

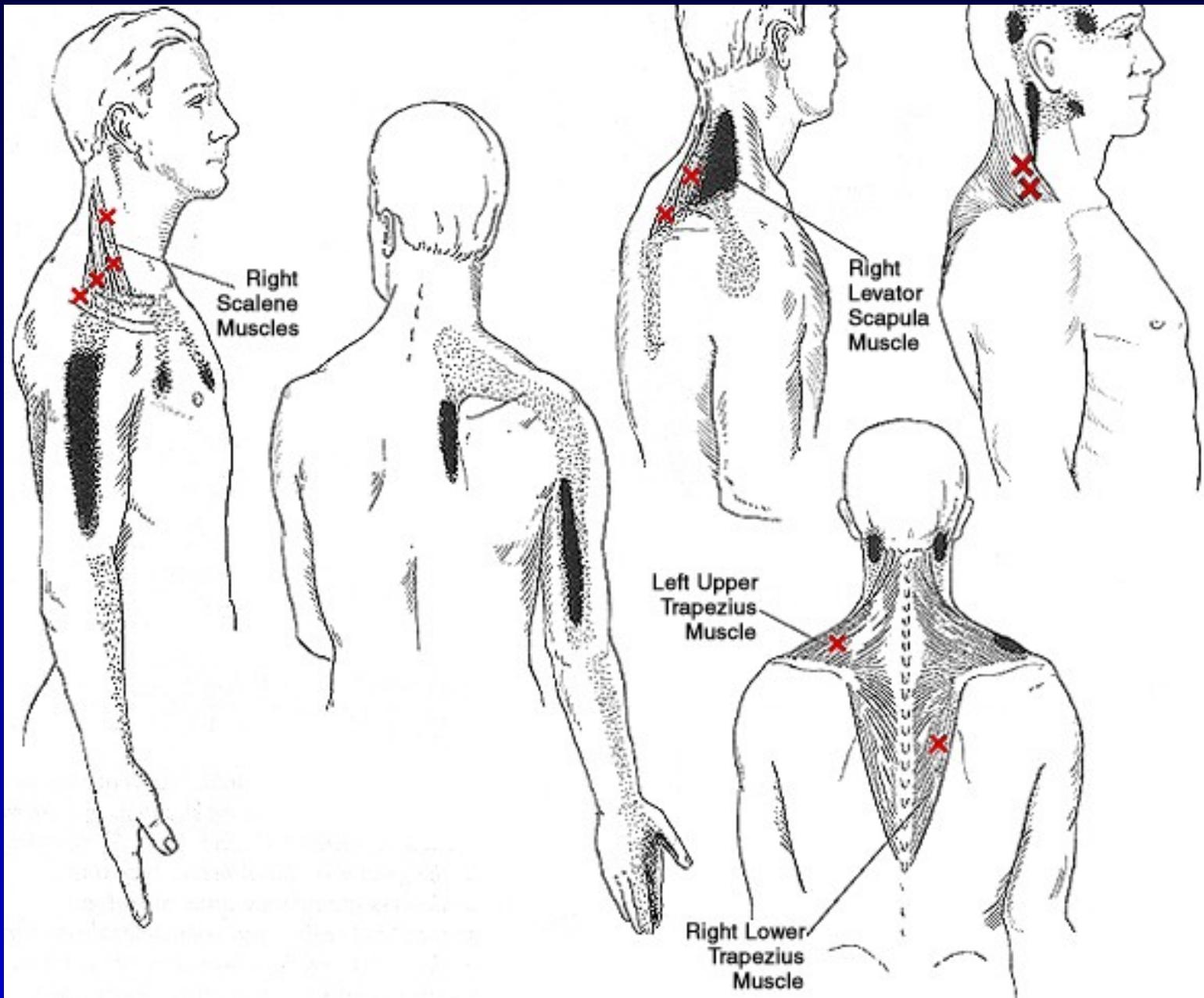
### Pain Fibromyalgia

- Widespread pain > 3months (rt & lft, above & below waist, axial)
- 11 of 18 tender points
- Sleep disturbance & fatigue (alpha invasion of stage 3 & 4)
- Neuroendocrine axis

### Myofascial Pain

- local / regional
- trigger points







# **Complex Regional Pain Syndrome (CRPS)**

- **Poorly Understood**
  - sensitization of wide-dynamic range (WDR) neurons in dorsal horn., become activated by A fibers as well as C
- **No definitive test**
- **Kozin's Criteria**
  1. Pain
  2. Vasomotor instability
  3. Swelling

# **Complex Regional Pain Syndrome (CRPS)**

- CRPS I: “RSD”
  - Sympathetic Independent
  - Sympathetic Maintained
    - Phentolamine challenge
    - Sympathetic block
- CRPS II: “Causalgia”
  - after nerve injury
- Treatment
  - Medications
  - Multidisciplinary Team
  - Early & Aggressive



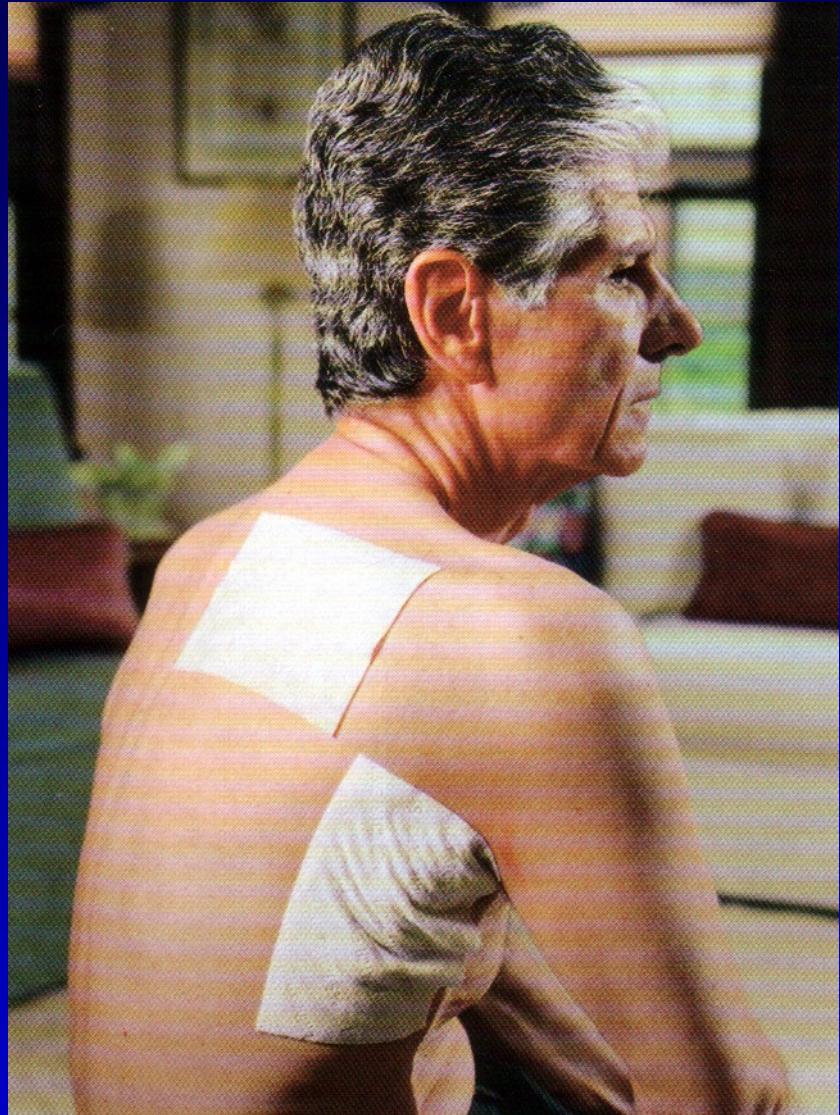
# **Post Herpetic Neuralgia**

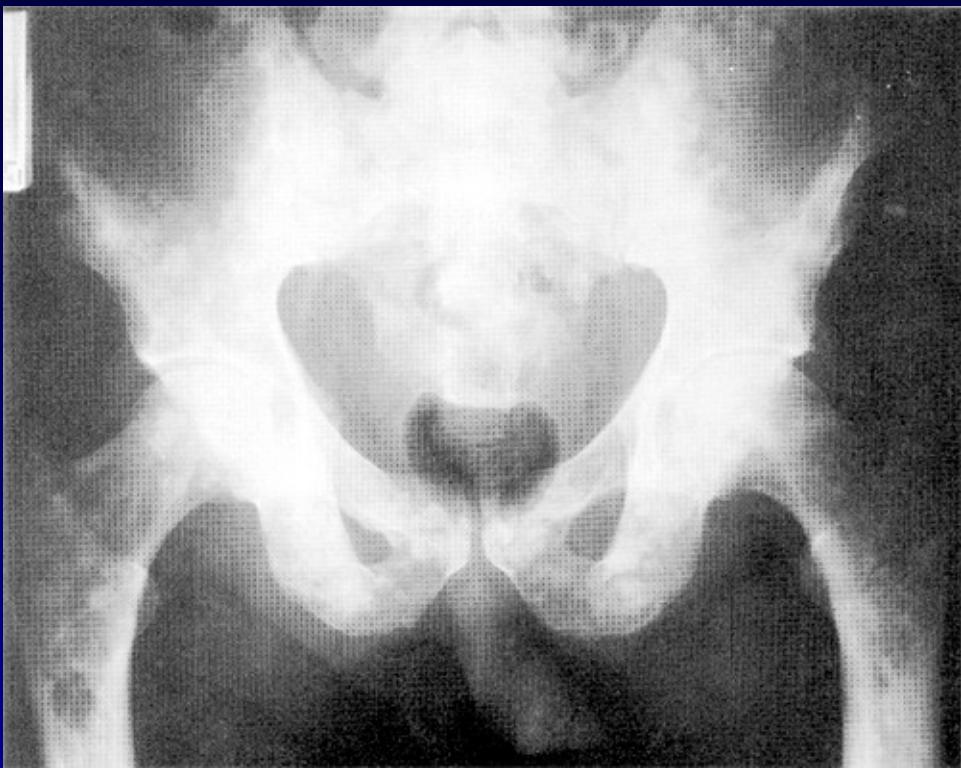
- Not localized as skin lesion
- Pain lasting > 1 month after skin heals
- Increase incidence with age
  - < 30 = no pain
  - age 40 = 33%
  - age 70 = 74%
- No correlation to extent of involvement,
  - may be related to immunocompromised state
- Location:
  - Thoracic Region (T5T6) 50%
  - Ophthalmic Division CN V 20%

# Post Herpetic Neuralgia

## Treatment:

- Antiviral agent < 72 hrs  
(acyclovir, valacyclovir, famciclovir)
- Steroids < 1st week: helpful for reducing pain, unclear if decreases incidence of post-herpetic neuralgia
- Sympathetic/Nerve root blocks < 2 wks
- Topicals (Capsaicin, lidocaine)
- TCA's, Anticonvulsants
- TENS





# Cancer Pain

- One of the greatest fears and source of morbidity
- Multidisciplinary approach
- NSAID's for bony pain
- No maximum recommended dose for opioids
- Start low and go slow
- Not all pain is cancer pain
- Multiple meds (adjuvants)

# Treatment

# **Initial**

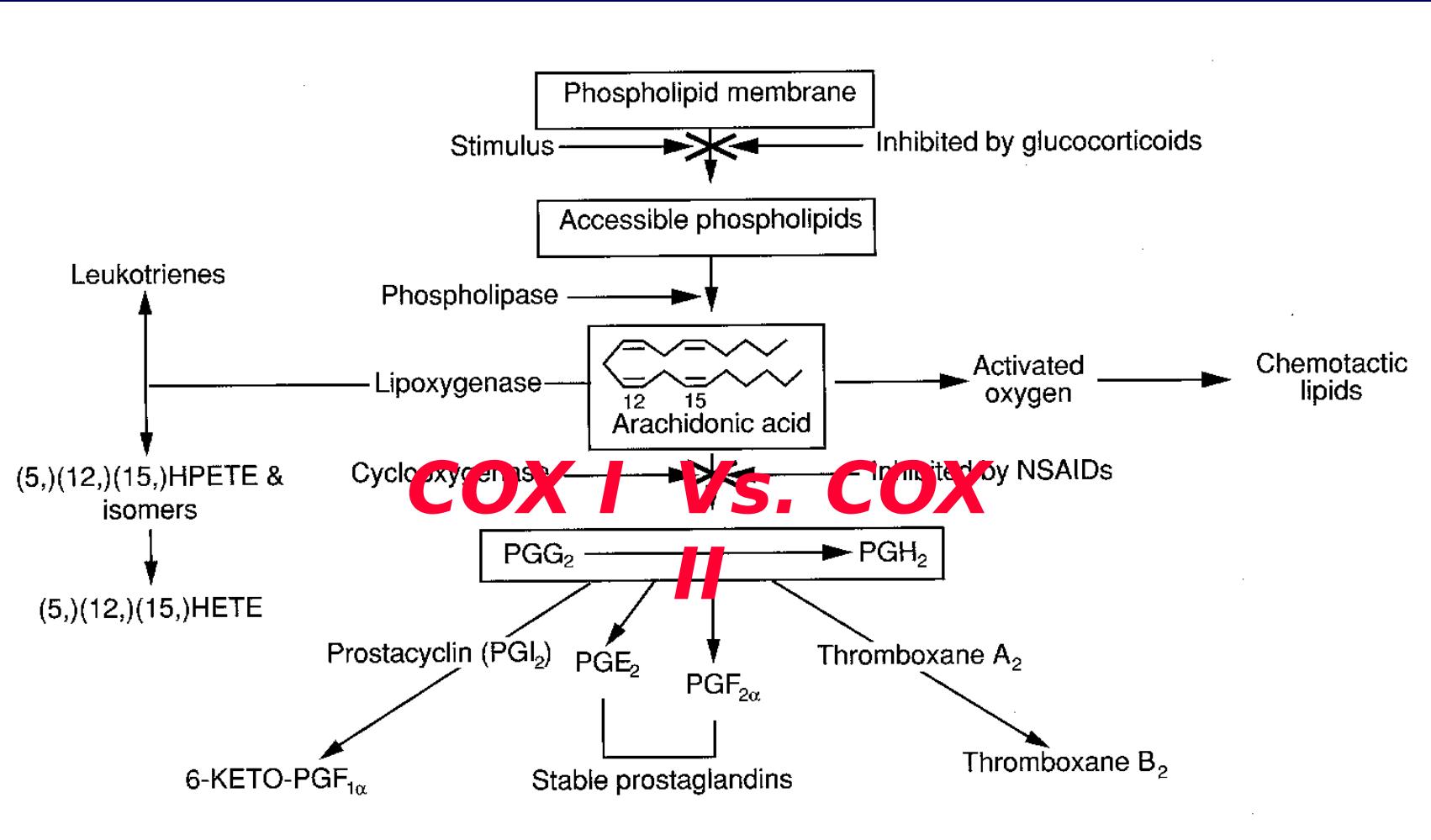
- **Initial Encounter**
  - build rapport, trust, decrease pain magnification
- **Appropriate Referrals / Studies**
  - Meet patient's needs
  - Labs, x-rays
  - Neurosurgery, Ortho, PM&R, Anesthesia Pain, Rheum
  - Psychiatry / Psychology (difficult during initial encounter)
  - Health improvement (smoking cessation, wt loss)
- **Patient Education**

# Medications

- Acetaminophen
- NSAID's
- Topicals
- Corticosteroids
- Antidepressants
- Anticonvulsants
- Anti-arrhythmics
- Opioids



# Arachidonic Acid Metabolism



# Non-Steroidal Anti-Inflammatory Drugs **(NSAID's)**

<u>NSAID</u>	<u>Name</u>	<u>T 1/2</u>	<u>Peak Conc</u>	<u>Platelet Eff</u>
Naproxen	Naprosyn	13 hr	2-4 hr	
Ketorolac	Toradol	5.3 hr	0.3-1 hr	3-24 hr
Indomethacin	Indocin	4.5 hr	1-2 hr	24-48 hr
Tolmentin	Tolectin	2 hr	0.5-1 hr	8-16 hr
Ketoprofen	Orudis	1.7 hr	0.5-2 hr	4 days
Ibuprofen	Motrin	1.7 hr	1-2 hr	5-10 hr
Diclofenac	Voltaren	1.25 hr	1.5-2 hr	5-10 hr

# **Non-Steroidal Anti-Inflammatory Drugs (NSAID's)**

<b><u>NSAID</u></b>	<b><u>Name</u></b>	<b><u>T 1/2</u></b>	<b><u>Peak Conc</u></b>	<b><u>Platelet Eff</u></b>
Oxaprozin	Daypro	58 hr	3-5 hr	21 days
Piroxicam	Feldene	38 hr	3-5 hr	7-20 days
Phenylbutazone	Azolid	72 hr	2 hr	7-20 days
Nabumetone	Relafen	20-30 hr	3 hr	no sig effect
Sulindac	Clinoril	16 hr	2-4 hr	4 days
Diflunisal	Dolobid	15 hr	2.3 hr	
Non acetylated salicylates ( Trilisate, Disalcid)				No effect

# **Non-Steroidal Anti-Inflammatory Drugs (NSAID's)**

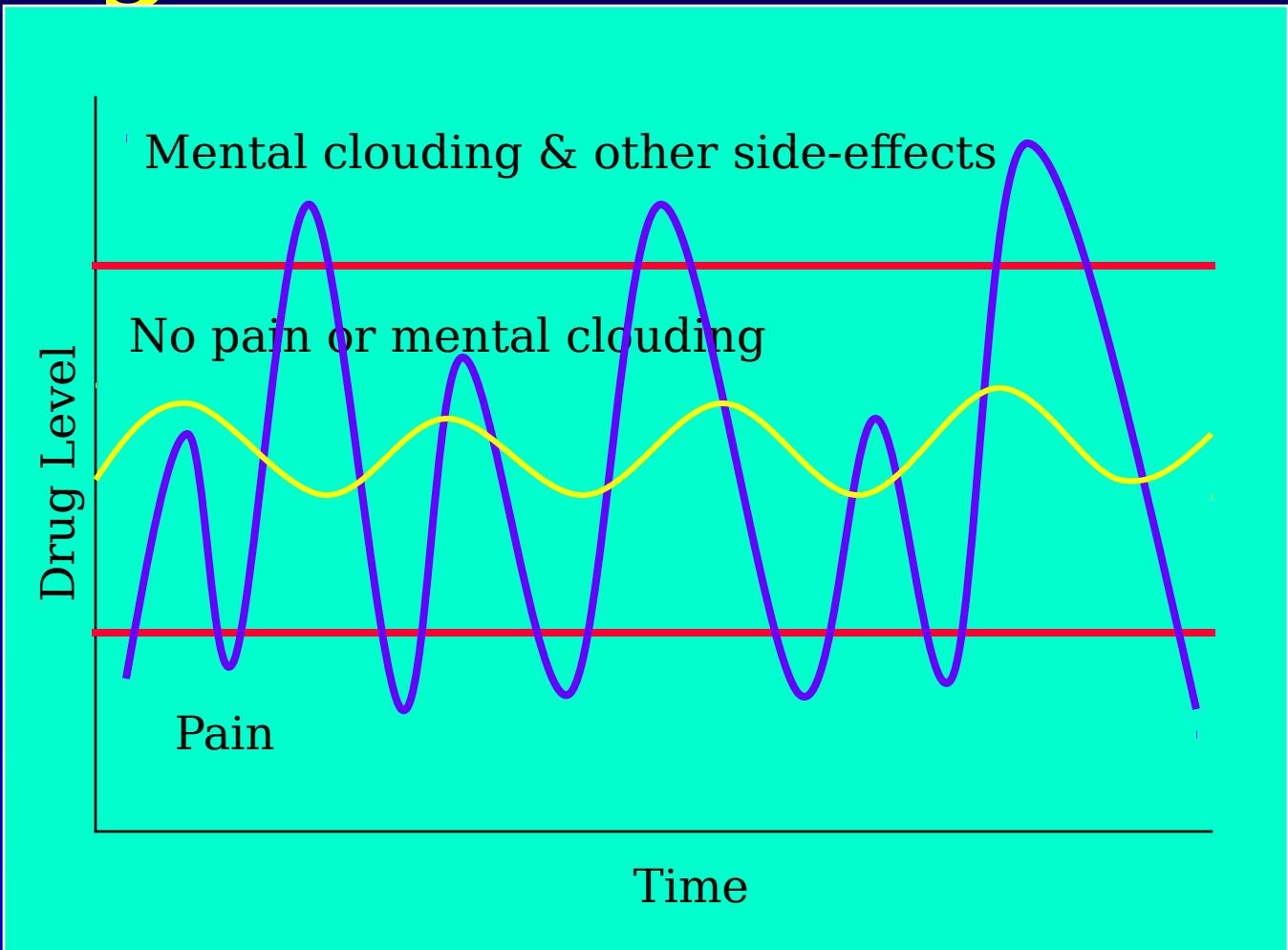
- Rofecoxib (Vioxx) 12.5, 25, 50mg
- Celecoxib (Celebrex) 100, 200mg
- Valdecoxib (Bextra) 10, 20mg

# Opioids

Generic Name	Trade Name	Oral Dose	Parenteral
Codeine		30mg q 3-4 h	10mg q 3-4 h
Hydrocodone	Vicodin, Lorcet	10mg q 3-4 h	N/A
Hydromorphone	Dilaudid	7.5mg q 3-4 h	1.5mg q3-4 h
Meperidine	Demerol	300mg q 2-3h	100mg q 3h
Morphine		30mg q 3-4h	10mg q 3-4h
Methadone	MSC, Dilaudid	15-20mg q 4-6h	N/A

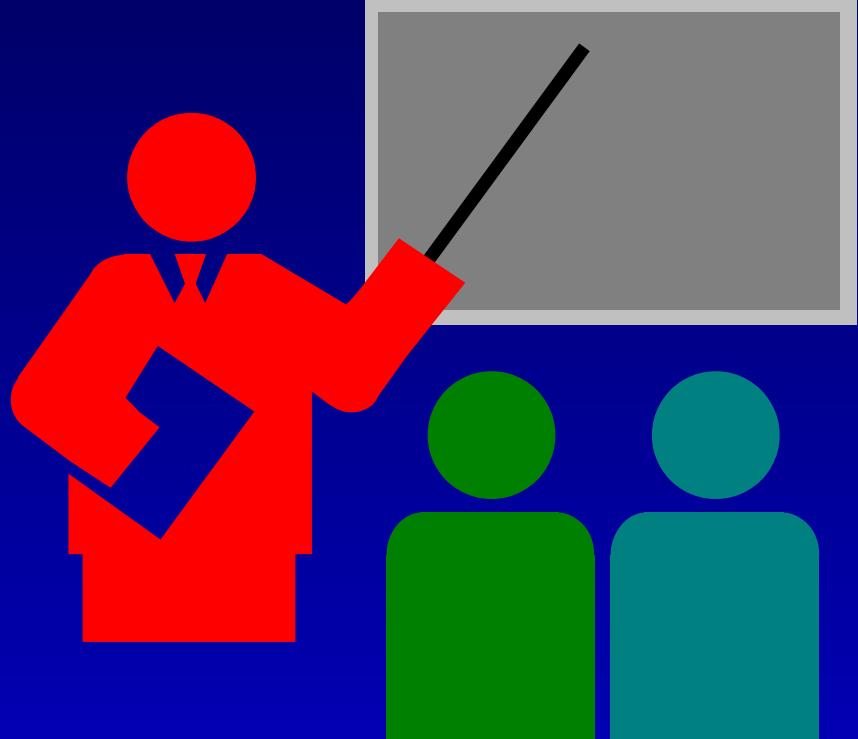
# Opioid - Long Acting Malignant vs. Non- malignant Pain

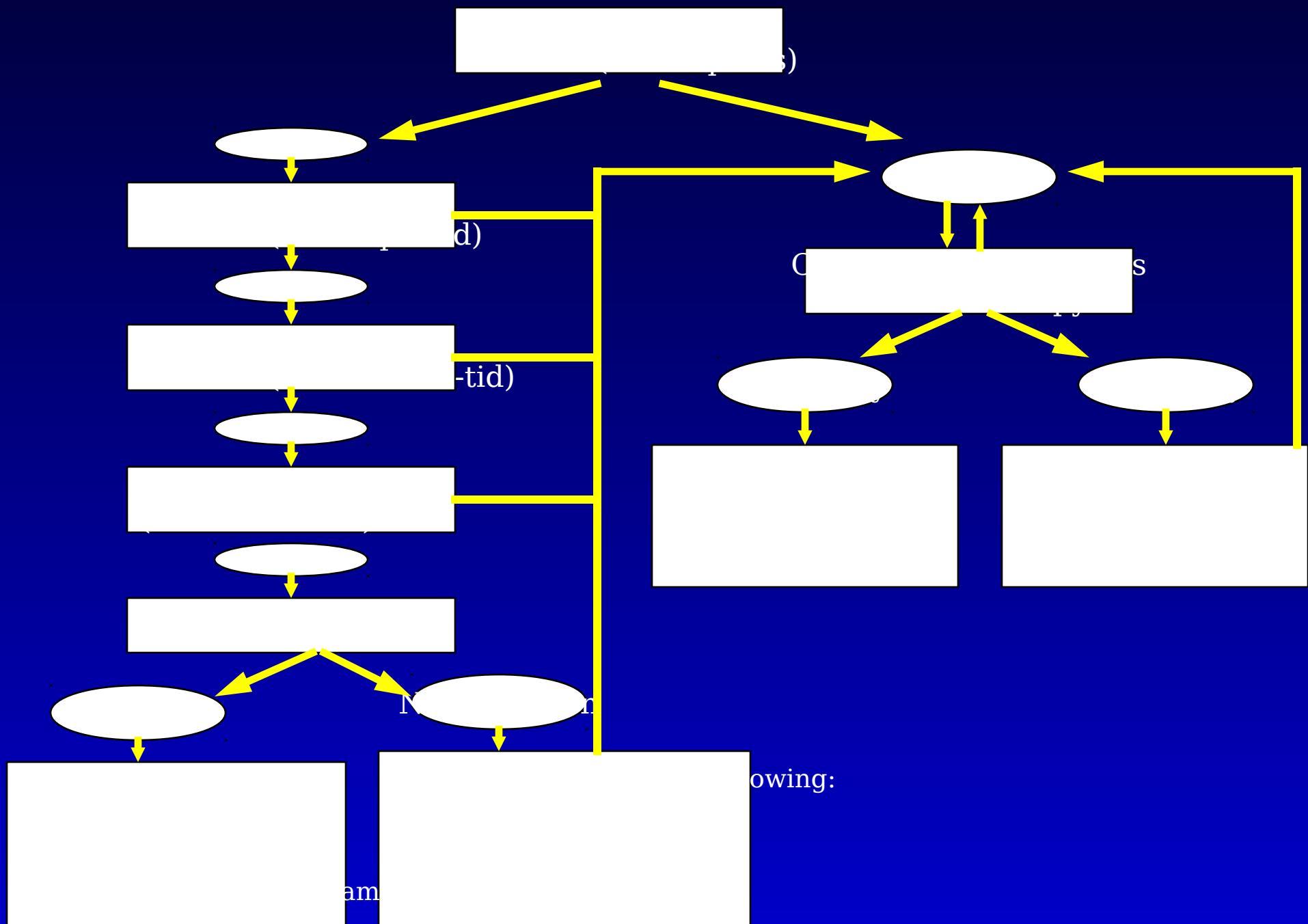
- MS Contin
- Oxycontin
- Duragesic
- Methadone



# Opioid - Side Effects

- Meperidine (Demerol)
  - Toxic metabolite cerebral irritant (irritability, tremors, convulsions)
  - Excreted through kidneys  $t_{1/2} 15-20$  hrs
- Respiratory depression
- Sedation
- Confusion
- Nausea
- Addiction
- Constipation





# Antidepressants

- TCA's > SSRI
- Efficacy is independent of antidepressant effect
- Re-uptake inhibitors of norepinephrine and serotonin
- Side Effects
  - Sedation
  - Dry mouth, urinary retention, visual changes, orthostasis
  - Wt gain
- Agitation in some patients

<u>Drug</u>	<u>Dose</u> <u>(mg)</u>	<u>Comments</u>
Amitriptyline	10-200	Most frequent
Nortriptyline	10-200	Less anticholinergic
Imipramine	10-200	
Desipramine	10-200	
Doxepin	10-200	Most sedating
Trazodone	50-300	Fewest cardiac

# Anticonvulsants

- Most effective in lancinating neuropathic
- Membrane stabilizing effect
- May be synergistic with antidepressants

Drug	Dose (mg)	Comments
Carbamazepine (tegretol)	200 q 6-8 hrs	Best studied
Phenytoin (dilantin)	100-200 tid (sustained release available)	Less anticholinergic
Gabapentin (neurontin)	100-1200 tid	Fewest side effects
Valproic Acid	250-500 tid	Least sedating
Topamax (topiramate)	25-200 bid	Renal impairment
Trileptal (Oxcarbazepine)	300-1g bid	Renal impairment
Tegretol XR	25-200 bid	Stable blood levels

# Medications - Other

- Adrenergic Agonists
  - *Clonidine*  
sympathetically maintained pain available in patch form
- Oral Anesthetics
  - *Mexiletine*  
oral lidocaine equivalent  
neuropathic pain decrease  
Na influx, decrease conduction potential cardiac clearance
- Benzodiazepines
  - primarily for anxiety not pain
- Benzo/Opiod like
  - *Tramadol*  
acts on mu opiate receptors  
mild serotonin re-uptake inhibitor
- Topicals
  - *Capsaicin / Zostrix*  
decreases substance P
  - *Lidoderm patch*

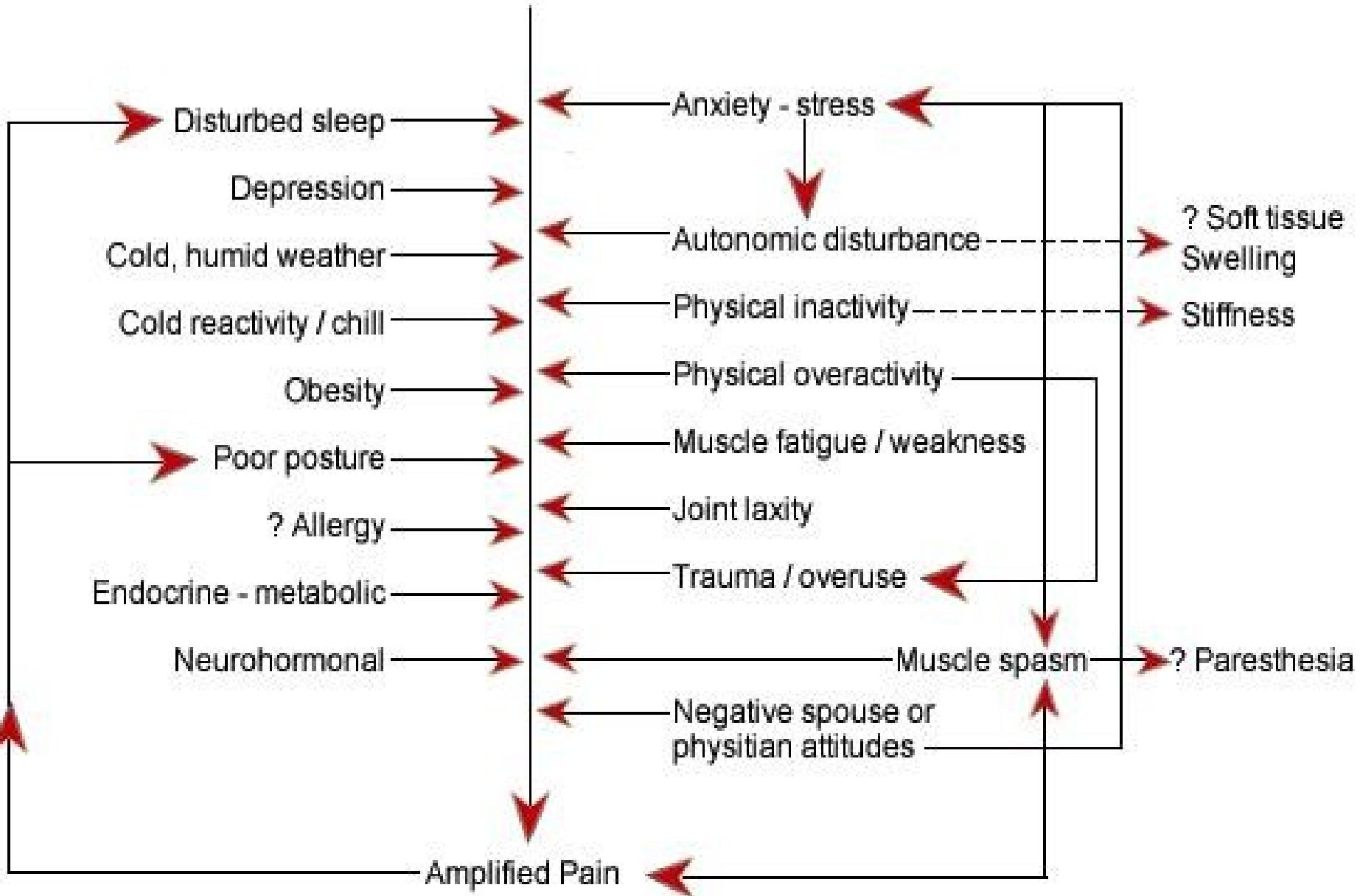
# Medications - *Other*

- NMDA Receptor Antagonist
  - Dextromethorphan
  - Ketamine
  - Methadone
- Anti-spastic
  - Zanaflex (2-4 mg po qhs)
  - Baclofen (Lioresal: 5mg qhs-tid)
- Botulinum Toxin
  - Botox
- Gabitril (Tiagabine)
  - GABA reuptake inhib
  - 2-8mg qhs

# Behavioral Management

- Reinforce well behaviors
- Don't reinforce pain behavior
- Identify and modify contributing factors...

## PROBABLE CONTRIBUTING FACTORS



# Therapy

- **Physical Therapy**
  - muscle imbalance
  - strengthening, stretching
  - aerobic conditioning
  - pool exercises
- **Occupational Therapy**
  - ADL's
  - Ergonomics, work eval
  - desensitization



# Modalities

- **Heat**

- hot packs, ultrasound, paraffin
- bath & shower

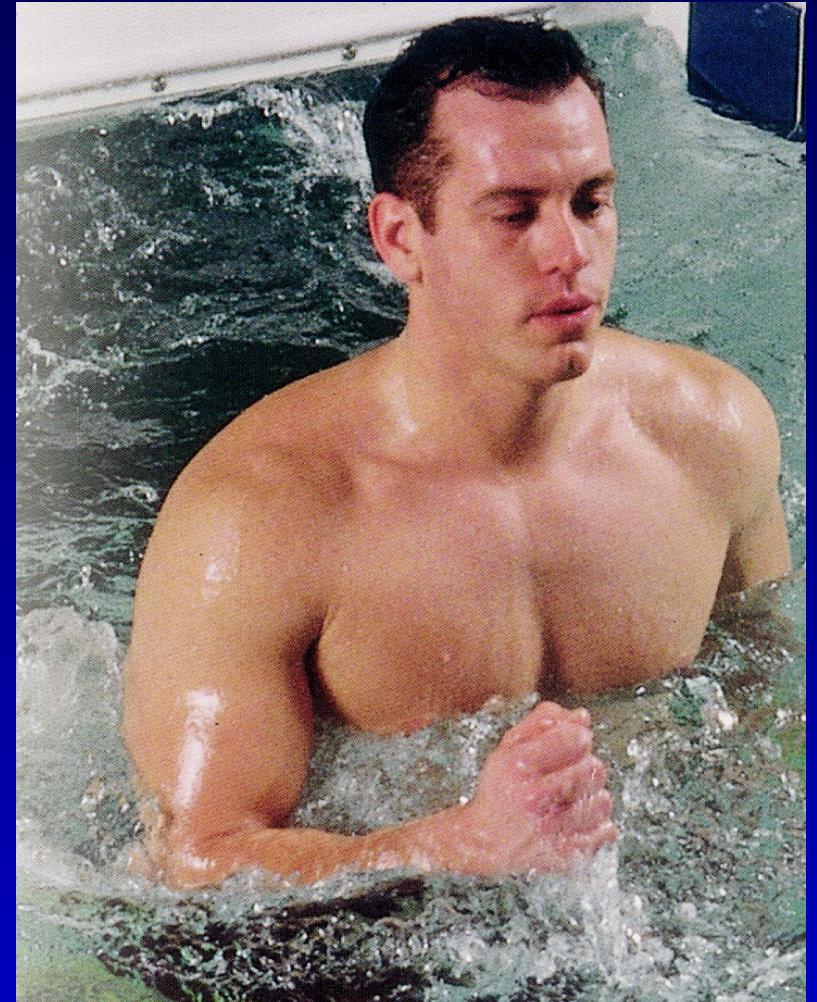
- **Ice**

- massage, packs (peas & corn)

- **Electrical Stimulation**

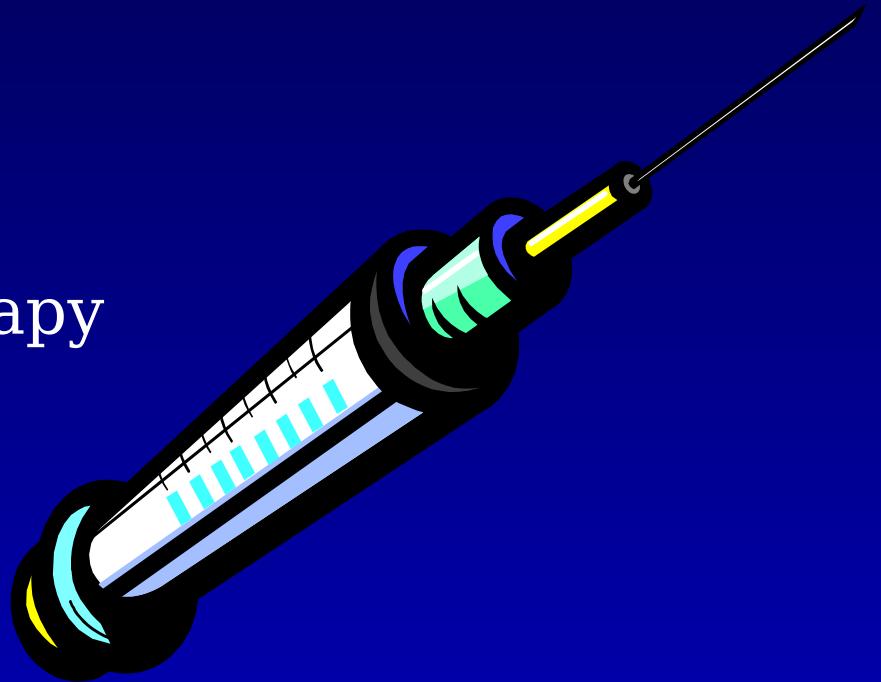
- Therapy
- TENS

- **Contrast Baths**



# Invasive Procedures

- **Joint/Trigger Point Injections**
  - diagnostic
  - therapeutic (break pain cycle)
  - may allow participation in therapy
- **Epidural Steroids**
- **Sympathetic Blocks**
- **Facet & Radiofrequency Ablation**
- **IDET**



# Epidural Steroid Injections

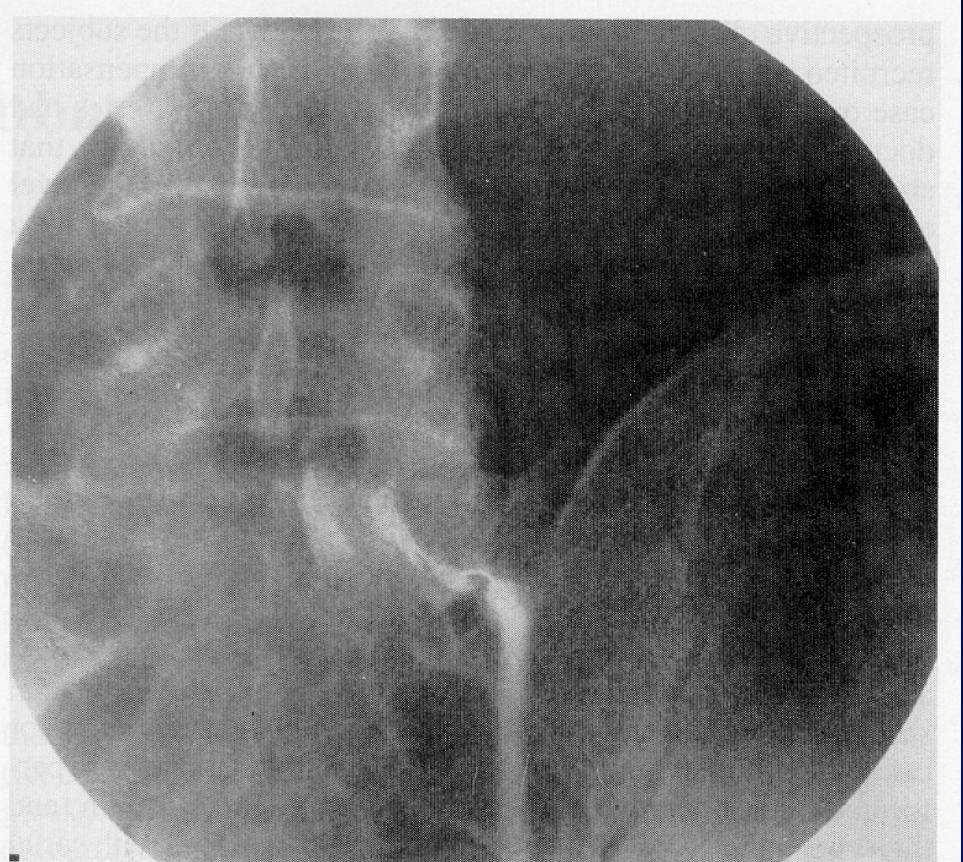


Fig 3. Example of an S1 transforaminal epidural injection on the anterior-posterior fluoroscopic projection demonstrating contrast outlining the right S1 nerve roots.

# IDET

